

UNIVERSITY OF MARYLAND - EUROPEAN DIVISION

MATH 012: Intermediate Algebra

Lecturer: Brian Cann

Final Exam

Time allowed: 150 minutes

Use of calculators permitted

Attempt 25 questions.

- Simplify:*
(a) $(3x^4 - 7x^3 + 7x^2 + 8x - 4) + (8x^3 - 11x^2 + 3x + 12)$
(b) $(6x^4 - 5x^2 + 7x - 12) - (9x^4 - 5x^3 + 3x^2 + 6x + 15)$
- Multiply:* (a) $6 + 8x - 7)(5x^2 + 7x)$
(b) $(8 - 3x)(7x - 8)$
- Multiply:* (a) $(2x^2 - 2x)^2$
(b) $(A - B)^3$
- Factor:* (a) $18x^7 + 12x^5 - 3x^3$
(b) $x^2 - 49$
- Factor:* (a) $x^2 - 3x - 54$
(b) $6x^2 - 11x - 10$
- Factor:* (a) $x^3 - 125$
(b) $x^3 + 64$
- Solve:* (a) $x^2 - 3x - 40 = 0$
(b) $4x^2 + x - 10 = (x - 2)(x + 1)$
- Find the equation of the line containing the points $(-3, -11)$ and $(-5, 9)$
- Find the midpoint of the line segment connecting the pair of points $(-3, -11)$ and $(-5, 9)$.
- Find the distance between the points $(-3, -11)$ and $(-5, 9)$.
- Multiply:* $\frac{x+6}{x-3} \cdot \frac{x-6}{x+3}$
- Multiply:* $\frac{x^2-6x-16}{x^2-64} \cdot \frac{x^2+x-2}{x^2+4x+4}$
- Add:* $\frac{x+9}{x-3} + \frac{x-12}{x+3}$
- Subtract:* $\frac{x-3}{x^2-5x+4} - \frac{x+7}{x^2-1}$
- Simplify:* $\frac{\frac{b+5}{b+2} - \frac{5}{b+3}}{\frac{3}{b+2} + \frac{b+4}{b+3}}$
- Solve:* $\frac{2x}{x+2} + 3x = \frac{-5}{x-3}$

17. Solve: $\frac{9}{x^2+4x-45} = \frac{7}{x+9} - \frac{7}{x-5}$
18. a) State the quadratic formula.
b) Solve the quadratic equation $3x^2 + 6x - 7 = 0$
19. Solve:
a) $\sqrt{3-5x} - 22 = -12$
b) $\sqrt{x+6} + \sqrt{x+2} = 2$
20. Simplify:
 $\sqrt[3]{8x^4y^6z^{12}}$
21. Simplify: $(2\sqrt{3} + 4)(3\sqrt{3} - 1)$
22. Simplify:
a) i^2
b) i^{25}
23. Simplify: $(2 + i) + (2 - i)(3 + 2i)$
24. Simplify: $\frac{5+2i}{3-2i}$
25. What is meant by the *x-intercepts* of a function? Find the x-intercepts of the quadratic function f: $f(x) = -2x^2 - 4x + 30$
26. What is meant by the *vertex* of a function? Find the vertex of the function f, where $f(x) = -2x^2 - 4x + 30$
27. Graph the function f, where $f(x) = -2x^2 - 4x + 30$.